

TWO NEW SPECIES OF *HAPLOPERLA* NAVÁS (PLECOPTERA:
CHLOROPERLIDAE) FROM NORTH CAROLINA, U.S.A.

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Abstract.—Two new species of stoneflies, *Haploperla parkeri* Kirchner and Kondratieff and *H. fleeki* Kondratieff, Kirchner, and Lenat, are described from Haywood Co., Macon Co., and Hoke/Moore Co., North Carolina, USA, respectively. Diagnostic characters are given to separate these two species from the three other known eastern North American species of *Haploperla*.

Key Words: Plecoptera, Chloroperlidae, *Haploperla*, new species, USA

Currently, three species of the Nearctic and eastern Palearctic genus *Haploperla* Navás are known from eastern North America. The common *Haploperla brevis* (Banks) is widespread from Alberta to eastern Canada south to Alabama, and north to Minnesota (Surdick 1985, Surdick 2004); *H. chukcho* (Surdick and Stark) appears restricted to an area of southwestern Mississippi (Hardy et al. 1994); and *H. orpha* (Frison) has been reported from North Dakota to northeastern Canada and United States (Surdick 1985, 2004).

Two additional eastern North American species collected by the authors are described below. The descriptions follow the style of Surdick (2004). One of these is an unpatterned species from the Great Smoky Mountains of North Carolina, whereas the second one is a patterned species from the Coastal Plain of North Carolina.

***Haploperla parkeri* Kirchner and
Kondratieff, new species**
(Figs. 1–2)

Adult.—**Male:** Forewing length 5.5–6 mm. General body color pale yellow in life,

white in alcohol. Antenna pale; head wider than pronotum, unpatterned except for three dark ocellar rings; abdomen lacking dark markings. Pronotum oval, wider than long; mesonotum and metanotum unpatterned. Wings macropterous, hyaline, representative of genus *Abdomen* without markings. Epiproct tablike, oval in dorsal view (Fig. 1), narrow, slightly recurved in lateral view (Fig. 2).

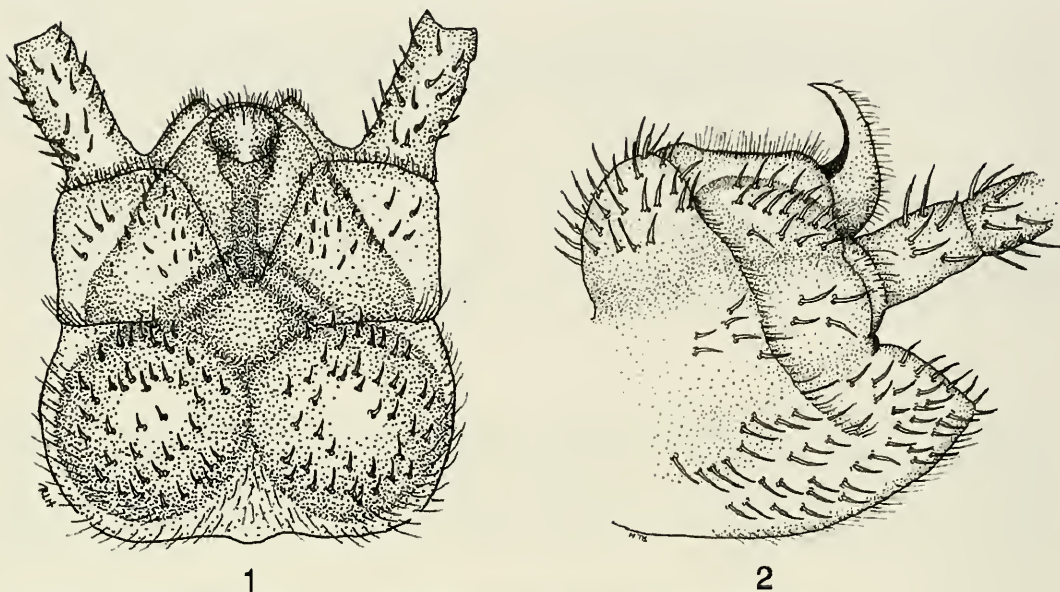
Female: Unknown.

Nymph.—Unknown.

Types.—Holotype ♂: North Carolina, Haywood, Co., small stream to Right Fork of Cove Creek, Co. Rd 1395, 0.6 mi SW Cove Creek Gap, 16 May 1983, R. F. Kirchner and B. C. Kondratieff. Paratypes: Same data as holotype, 4 ♂; Macon Co., Shot Pouch Creek, 26 May 1994, B. P. Stark, S. W. Szczytko, and J. Sandberg, 1 ♂.

Holotype deposited in the National Museum of Natural History, Smithsonian Institution, paratypes in the Colorado State University (CSUC), R. F. Kirchner Collection and B. P. Stark Collection, Clinton, Mississippi.

Etymology.—We honor our friend, Dr.



Figs. 1–2. *Haploperla parkeri*. 1, Male terminalia, dorsal. 2, epiproct, lateral view.

Charles R. Parker, trichopterist and aquatic biologist, Great Smoky Mountains National Park.

Diagnosis.—*Haploperla parkeri* can be distinguished readily from both patterned species, *H. chukcho* and *H. orpha* by the lack of any pigmentation. It is most similar to the usually unpatterned *H. brevis*, but the male terminalia in lateral view, can be distinguished easily by the narrow epiproct, which is distinctly wedged-shaped in *H. brevis*, as illustrated by Surdick (1985: figs. 137–139, Surdick 2004: figs. 6.275, 6.277). Many male specimens examined from the vicinity of the Canadian and Pennsylvania type localities of *H. brevis*, and its recognized synonyms support the concept of *H. brevis* as clearly presented by Surdick (1985, 2004).

Remarks.—The type locality (35°37'27"N 83°3'4"W) is approximately 1,158 m elevation, and at this location the stream is high gradient with many spring seeps. Other stoneflies collected with *H. parkeri* included *Sweltsa lateralis* (Banks), *S. urticae* Ricker, *Malirekus hastatus* (Banks), *Oconoperla innubila* (Needham and Claassen),

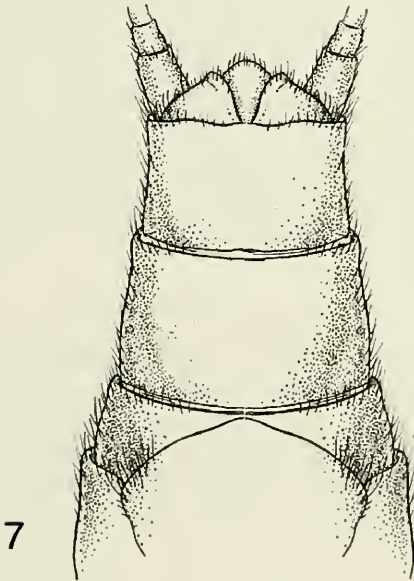
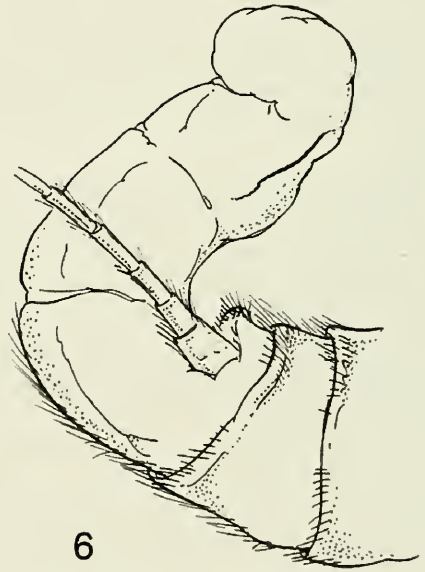
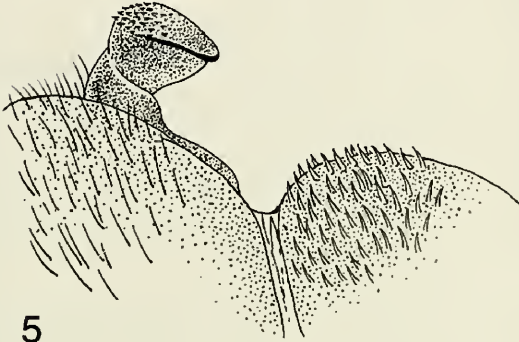
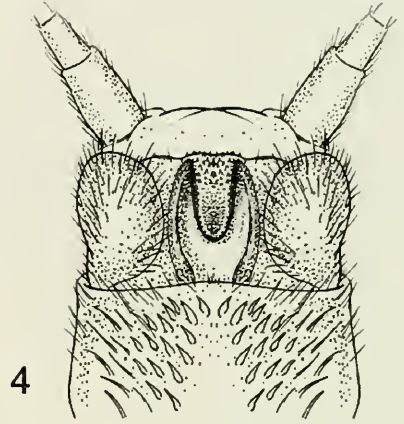
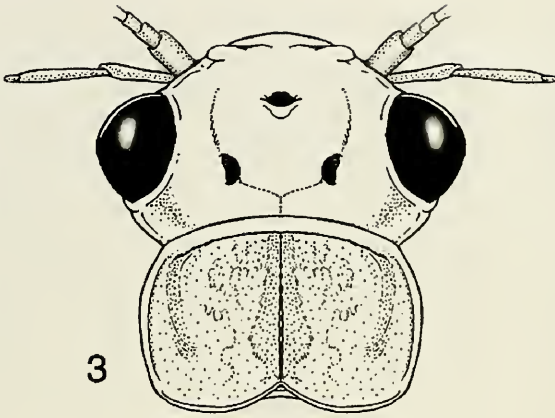
Isoperla spp., *Tallaperla anna* (Needham and Claassen), and *T. maria* (Needham and Claassen). Shot Pouch Creek draining Wayah Bald in the Nantahala National Forest is a well-known collecting site for rare stoneflies (Stark and Stewart 1982a, b).

***Haploperla fleeki* Kondratieff, Kirchner, and Lenat, new species**
(Figs. 3–7)

Adult.—General body color straw yellow in life, pale yellow in alcohol. Wing venation representative of genus. Head with dusky marking as Fig. 3, pronotum with dusky lateral margins, rugulae dusky (Fig. 3), meso- and metathoracic scutellum with dusky U-shaped and bisecting markings, abdomen with dusky longitudinal stripe.

Male: Body length 6.0–6.5 mm; forewing length 7.0 mm. Epiproct tip in dorsal view elongate, parallel-sided, apex tapered (Fig. 4), in lateral view, tip broad, minute spicules at base (Fig. 5). Aedeagus in lateral view with skeletal rod (Fig. 6).

Female: Body length 8.0–8.5 mm; forewing length 7.0–7.5 mm, venation dark.



Figs. 3-7. *Haploperla fleeki*. 3, Head and pronotum. 4, Male terminalia, dorsal. 5, Epiproct, lateral view. 6, Aedeagus, lateral view. 7, Female terminalia, ventral view.

Subgenital plate narrowly rounded at apex (Fig. 7).

Pre-emergent nymph.—Typical of genus (Surdick 1985), adult color pattern visible.

Types.—Holotype ♂: North Carolina, Hoke/Moore Co., Little River, Morrison Bridge Road, East of Southern Pines, 18 May 2004, B. Kondratieff, R. Kirchner, R. Zuellig, and D. Lenat. Paratypes: Same data as holotype, 7 ♂, 41 ♀. Holotype deposited in the National Museum of Natural History, Smithsonian Institution, paratypes in the Colorado State University (CSUC), R. F. Kirchner Collection, and Monte L. Bean Life Sciences Museum, Brigham Young University (BYUC).

Etymology.—The patronym honors Eric Fleek, Department of Environment and Natural Resources, Division of Water Quality (DWQ), Raleigh, North Carolina. Eric first noted the uniqueness of the nymph in benthic samples being processed by his agency.

Diagnosis.—Using the excellent treatment of the eastern Chloroperlidae by Surdick (2004), *H. fleeki* is similar to the two other patterned species, *H. chukcho* and *H. orpha*. The epiproct of *H. fleeki* is most similar to *H. chukcho*, but in dorsal view, much narrower in width, and narrowing toward the apex (Fig. 4). The epiproct of *H. chukcho* is broad, and broadly rounded at the apex (see Surdick 2004: figs. 6.282–6.284). The female appears distinctive with the combination of the dusky markings and a more acute apex of the subgenital plate (Fig. 7).

Remarks.—The lower Little River is included in the Cape Fear River Basin, including parts of Moore, Hoke, Lee, Harnett and Cumberland counties. Land use is mostly forest (80%), with small amounts of cropland (8%) and pasture (8%). The lower Little River is largely in the Sandhills ecoregion, but the headwater area lies within the Piedmont. Sandhills streams usually have abundant groundwater storage (due to the coarse sandy soils), and maintain good flow even during drought periods. The ex-

istence of piedmont soil in the headwaters of the Upper Little River, however, produces atypical flow characteristics for a Sandhills stream. For example, during the record drought of 2002, the lower Little River had a prolonged period with little flowing water, and the macroinvertebrate rating crashed from an “Excellent” bioclassification (1988–1998) to only “Good-Fair” in October 2002 and January 2003 (North Carolina DWQ, Kathy Herring, unpublished data). Full recovery, however, had occurred by the time of the next DWQ sample in March 2004.

According to the North Carolina DWQ, the lower Little River has very good water quality, characterized by low specific conductance (median = 36 umhos/cm), low nutrient levels (nitrogen and phosphorus), and high dissolved oxygen (median = 8.0 mg/l, minimum = 5.5 mg/l). This site is slightly acidic (median pH = 5.8) and humic acids usually stain the water.

More than 84 EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa are known from the lower Little River (<http://www.esb.enr.state.nc.us/bar.html>). Many of these taxa are sandhills endemics, including the caddisflies, *Hydropsyche decalda* Ross, *Brachycentrus chelatus* Ross, *Setodes arenatus* Holzenthal, and the stoneflies, *Alloperla lenati* Kondratieff and Kirchner, *Isoperla* n. sp., and *Helopicus bogaloosa* Stark and Ray.

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